CLAIMS

1. A method for promoting the expansion of hematopoietic stem cells in culture, comprising culturing the cells in a culture including an effective amount of thrombopoietin (TPO), a flt3 ligand, and interleukin 6 (IL6).

2. The method of claim 1, further comprising culturing the cells with an effective amount of interleukin 3 (IL3).

3. The method of claim 1, further comprising culturing the cells with an effective amount leukemia inhibitory factor (LIF).

4. The method of claim 1, further comprising culturing the cells with an effective amount of a c-kit ligand.

5. The method of claim 1, wherein the hematopoietic stem cells are characterized by the capability of self-renewal and the ability to give rise to all hematopoietic cell lineages.

6. The method of claim 1, wherein the hematopoietic stem cells are human hematopoietic stem cells.

7. The method of claim 6, wherein the human hematopoietic stem cells are $CD34^+$.

8. The method of claim 6, wherein the human hematopoietic stem cells are $CD34^{+}Thy\text{-}1^{+}$.

9. The method of claim 6, wherein the human hematopoietic stem cells are $CD34^{+}Thy\text{-}1^{+}Lin^{-}$.

10. A method for restoring hematopoietic capability in a subject, comprising:

(a) culturing a population comprising hematopoietic stem cells in the presence of mpl ligand, a flt3 ligand, and interleukin 6 (IL6) under conditions which favor expansion of the hematopoietic stem cell population; and

(b) administering an effective amount of said expanded population of stem cells to the subject.

11. The method of claim 10, further comprising culturing the cell in the presence of interleukin 3 (IL3).

12. The method of claim 10, further comprising culturing the cell in the presence of an effective amount leukemia inhibitory factor (LIF).

13. The method of claim 11, further comprising culturing the cell in the presence of a c-kit ligand.

14. The method of claim 10, wherein the hematopoietic stem cells are human.

15. The method of claim 10, wherein the human hematopoietic stem cells are $CD34^{+}$.

16. The method of claim 10, wherein the hematopoietic stem cells administered to the subject are allogeneic.

17. The method of claim 10, wherein the hematopoietic stem cells administered to the subject are autologous.

18. A method for modifying a hematopoietic stem cell, comprising contacting a gene delivery vehicle comprising a polynucleotide sequence with a population of hematopoietic stem cells cultured in the presence of an effective amount of a mpl ligand and a flt3 ligand.

19. The method according to claim 18, further comprising culturing the hematopoietic stem cells in the presence of a c-kit ligand.

20. The method according to claim 19, further comprising culturing the hematopoietic stem cells in the presence of a interleukin 3 (IL3).

21. The method of claim 18, wherein the polynucleotide sequence encodes a product selected form the group consisting of a peptide, a ribozyme and an antisense sequence.

22. The method of claim 18, wherein the gene delivery vehicle is selected from the group consisting of a retroviral vector, a DNA vector and a liposomal delivery vehicle.

23. A method for modifying a hematopoietic stem cell, comprising contacting a gene delivery vehicle comprising a polynucleotide sequence with a population of hematopoietic stem cells cultured in the presence of an effective amount of a thrombopoietin ligand, a flt3 ligand, and interleukin 6 (IL6).

24. The method of claim 23, further comprising culturing the stem cell in the presence of an effective amount of leukemia inhibitory factor (LIF).

25. The method of claim 23, further comprising culturing the stem cell in the presence of an effective amount of interleukin 3 (IL3).

26. The method of claim 23, further comprising culturing the stem cell in the presence of a c-kit ligand.

27. The method of claim 25, further comprising culturing the stem cell in the presence of a c-kit ligand.

28. The method of claim 23, further comprising culturing the stem cell in the presence of fibronectin or RetroNectin™.

29. The method of claim 23, wherein the polynucleotide sequence encodes a product selected form the group consisting of a peptide, a ribozyme and an antisense sequence.

30. The method of claim 23, wherein the gene delivery vehicle is selected from the group consisting of a retroviral vector, a DNA vector and a liposomal delivery vehicle.

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